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environmental consultants, inc.
8160 South Highland Drive • Sandy, Utah 84093 • Phone (801) 943-4144 • Fax: (801) 942-1852

m/023/007

FAX TRANSMISSION COVER SHEET

CORPORATE OFFICE
8160 SOUTH HIGHLAND DRIVE
SANDY, UT 84093
PH: (801) 943-4144
FAX #: (801) 942-1852

Date:	***November 1, 2000***
Time:	***11:30 A.M.***
To:	***Mr. Don Ostler, UDWQ - 538-6016*** ***Ms. Beth Wondimu, UDWQ,*** ***Dennis Frederick, UDWQ,*** ***Mr. Fred Pehrson, UDWQ*** ***Mr. Doug Jensen, UDOGM - 359-3940*** ***Mr. Wayne Hedburg, UDOGM*** ***Messrs. Steve Flechner and Gene Webb, North Lily - (303) 293-2235***
Fax:	***-- PLEASE DISTRIBUTE ACCORDINGLY --***
Subject:	***Letter - Request for Approval to Regrade Spend Heap Leach Material Beyond Liner Limits; North Lily Mining Company Silver City, Utah Facility***
From:	***Nina Cameron for Bob Bayer***

YOU SHOULD RECEIVE 9 PAGE(S), INCLUDING THIS COVER SHEET. IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL (801) 943-4144

Attached please find a copy of the above referenced letter, the original will be mailed to you today.

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environmental consultants, inc.
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October 31, 2000

Mr. Don Ostler, P.E.
Director
Utah Division of Water Quality
288 North 1460 West
P.O. Box 144870
Salt Lake City, Utah 84114-4870

Via Fax
(801) 538-6016

RE: Request for Approval to Regrade Spent Heap Leach Material Beyond Liner Limits; North Lily Mining Company Silver City, Utah Facility

Dear Mr. Ostler:

We are consultants to, and writing on behalf of, North Lily Mining Company. As the Division of Water Quality (DWQ) is aware, the subject heap leach facility is in the process of being closed. In order for the heap leach itself to be reclaimed to a stable configuration (one in which it will be reasonably resistant to erosion), it is necessary to reduce the slopes of the sides of the heap by regrading. To achieve a reasonably stable slope, it will be necessary to extend the toes of the side slopes beyond the existing synthetically lined pad margins. Doing so requires the approval of the DWQ; however, North Lily must first demonstrate to DWQ's satisfaction that this action will not adversely affect ground water quality. This letter's intent is to provide that demonstration.

Solution re-application to the heap ceased during the past summer; however the pad continues to drain, currently at a rate of less than 10 gpm, and the draindown rate has been in decline since solution re-application was stopped. Sources of draindown fluid from now forward will be fluids retained in the heap at this time and additional fluids gained by infiltrating precipitation. Following regrading this fall, the heap will be ripped, mulched and amended (with composted cow manure and inorganic fertilizers as necessary), and seeded. Topsoil that had been salvaged for reclamation purposes will not be placed on the heap since the Division of Oil Gas and Mining has determined it will be a source of noxious weeds that would not only be a seed source for further spread of noxious weeds in the area but would also prevent the re-establishment of the stable native vegetative cover that is essential for post-closure stabilization of the heap surface. Ripping and mulching will enable the heap surface to absorb water uniformly and minimize runoff to the pad margins. When vegetation is established, beginning in Spring 2001, the pad's ability to shed water and promote reduced infiltration will be further enhanced. Until that time, any precipitation water leaving the pad surface by sheet flow will move toward the pad margin and, to the extent the surface cannot absorb the water, may leave the pad as runoff and infiltrate into the fill materials and native soils adjacent to the pad. In addition, this water along with

direct precipitation may infiltrate that portion of the leach pad surface that is regraded beyond the liner margin and infiltrate directly into underlying soils or fill.

In order to assess the worst-case water quality of any solutions leaving the pad, meteoric water mobility tests (MWMP) were conducted on two composite samples of near-surface heap materials from two test pits excavated on the north and south ends of the pad surface. These tests were carried out in accordance with the protocol established by the State of Nevada and the Nevada mining industry and now being reviewed for standard development by the American Society of Testing Materials (ASTM). The MWMP test is designed to simulate leaching by precipitation of readily soluble major and trace elements. The MWMP extract is derived from a 24-hour column leach test using dejonized water. MWMP test results have been commonly applied in ground water impact evaluations in Utah as well as in Nevada and other western states. The results of the MWMP tests on the North Lily samples are summarized, along with current Utah Ground Water Quality Standards, in the table shown below. Laboratory analytical reports are attached. Test results are expressed as concentrations in mg/l in the MWMP extract solution.

North Lily Mining Company Silver City Heap Leach Facility Meteoric Water Mobility Test Results on Surficial Samples Heap Leach Pad Samples			
Parameter	North Sample (SCH-N)	South Sample (SCH-S)	Ground Water Quality Standard
Cyanide-WAD (mg/)	<0.01	<0.01	0.02 (free)
Sodium (mg/l)	572	85.8	No Standard
Nitrite-N (mg/l)	2.38	1.68	1.0
Nitrate-N (mg/l)	9.81	19.7	10.0
Sulfate (mg/l)	1680	70.4	No Standard
Silver (mg/l)	<0.005	<0.005	0.1
Arsenic (mg/l)	0.062	0.135	0.05
Barium (mg/l)	0.015	0.146	2.0
Cadmium (mg/l)	<0.002	<0.002	0.005
Chromium (mg/l)	<0.006	<0.006	0.1
Mercury (mg/l)	0.0004	0.0003	0.002
Lead (mg/l)	0.076	0.089	0.015
Selenium (mg/l)	0.013	0.004	0.05
TDS (mg/l)	1890	510	No Standard

With the exception of nitrate, nitrite, arsenic and lead, the concentrations of the parameters analyzed in the MWMP extracts from each sample are all well below the ground water quality standards.

Surface flow, primarily as sheet wash, will occur when surficial soils are saturated. Under these conditions and when vegetation is established, contact time of surface flows with heap material will be minimal; therefore the concentrations of contaminants in water that may leave the lined portion of the pad are likely to be substantially less than those measured in the MWMP extracts.

Impacts to ground water quality from water that contacts the heap material, reaches the pad margin, and infiltrates into the surrounding fill and soils will be minimized or prevented by the site hydrogeology: ground water is deep and there is a substantial thickness of relatively low-permeability lake bed sediments immediately beneath the site. As described in the Statement of Basis for Permit No. UT-UGW230001, ground water depth in the site vicinity is reported to be 474 feet or greater. Lake bed and alluvial deposits were 325 feet thick in a test hole drilled at the southwest corner of the leach pad, again according to the Statement of Basis. These deposits were described as sand, silt, gravel, and clay with "several beds of clay in the test hole ... 25 to 30 feet thick."

The clayey nature and great thickness of the alluvial and lake bed sediments will serve to retard the rate of infiltration and contribute substantially to prevention of aquifer contamination by fluids that may pass, leave the pad due to runoff or infiltration along the regraded margins. Contaminants of concern in these fluids are those with concentrations in the MWMP extract that approach or exceed the Utah Ground Water Quality Standards. These four parameters, nitrate, nitrite, arsenic, and lead would be attenuated by a number of widely known and documented attenuation mechanisms.

Much of the nitrate/nitrite will be attenuated by plants and their root systems as water infiltrates into the surficial soils. Although nitrate/nitrite are not attenuated as effectively in soils as are cations and some other anions, some attenuation in the thick, clay-rich, presumably lake bed sediments will undoubtedly occur. Although clay particle surfaces are largely negatively charged and attractive to cations, anions such as nitrate/nitrite can be attenuated either due to complexation resulting in a positively charged ionic compound or by creation of positively charged sites that result from disequilibrium in charge balance at the clay particle surfaces.

Attenuation mechanisms for lead and arsenic are known to include cation adsorption on negatively charged clay particles, co-precipitation with iron and manganese oxides (also most effectively on clay particles), and complexation by and precipitation with organic material in the soil profile. The former two mechanisms are most likely to lead to attenuation of lead and arsenic in the thick, often clayey soils at the North Lily property. However, attenuation of lead and arsenic by soil organic matter in the reclaimed pad surface will also occur beginning immediately due to the presence of composted manure and carrying on as the upper, organic-rich part of the soil profile develops further over time.

Based upon the foregoing demonstration, the net impact to ground water quality in the deep aquifer beneath the site by fluids that may escape the line portions of the pad due to the proposed regrading of the pad margins is anticipated to be *de minimus*. Accordingly, North Lily requests the DWQ's approval of the proposed pad margin regrading. As the Division is aware, time is of the essence for this project; therefore, a decision and response by DWQ as soon as possible would be appreciated.

Please call the undersigned with any questions you may have regarding this request.

Sincerely,

MJC Robert J. Bayer

Robert J. Bayer
Vice President

Attachments

cc: Dennis Frederick, DWQ - W/ Attachment
Fred Pehrson, DWQ - W/Attachment
Beth Wondimu, DWQ - W/Attachment
Wayne Hedburg, Division of Oil Gas and Mining - W/Attachment
Stephen Flechner, North Lily Mining Company - W/Attachment
Mike Keller, VanCott Bagley - W/Attachment

SVL ANALYTICAL, I[redacted]
One Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-

REPORT OF ANALYTICAL RESULTS

CLIENT : JBR Environmental Consultants

SVL JOB No. : 9540[illegible]
SVL SAMPLE No.: 242616

CLIENT SAMPLE ID: SCH-S
Sample Collected: 8/22/00 13:00
Sample Receipt : 8/29/00
Date of Report : 9/19/00

% Moisture: 0.49
Matrix: BSOIL
Extract: MWMP 9/06/00

Determination	Result	Units	Method	Test Date	Reference
% Passing -200	15.1	g	Sieve	9/06/00	
Moisture to Sat.	636	mL		9/06/00	
MWMP TIME	24.0	(hr)	MWMP	9/06/00	
pH	8.85		150.1	9/12/00	1
pH LIXIVIANT	5.86		150.1	9/06/00	1
pH Paste	9.12		ASA M9	9/15/00	
Weight	5.00	kg		9/06/00	
TDS	510	mg/L Ext	160.1	9/11/00	1
Cyanide-WAD	<0.01	mg/L Ext	1677	9/14/00	
Sodium	85.8	mg/L Ext	200.7	9/14/00	1
Nitrite-N	1.68	mg/L Ext	300.0	9/11/00	1
Nitrate-N	19.7	mg/L Ext	300.0	9/11/00	1
Sulfate, SO4	70.4	mg/L Ext	300.0	9/11/00	1
Silver	<0.005	mg/L Ext	200.7	9/14/00	1
Arsenic	0.135	mg/L Ext	206.2	9/13/00	1
Barium	0.146	mg/L Ext	200.7	9/14/00	1
Cadmium	<0.002	mg/L Ext	200.7	9/14/00	1
Chromium	<0.006	mg/L Ext	200.7	9/14/00	1
Mercury	0.0003	mg/L Ext	245.1	9/12/00	1
Lead	0.089	mg/L Ext	239.2	9/14/00	1
Selenium	0.004	mg/L Ext	270.2	9/14/00	1

REFERENCES: 1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-20; 2) "Test Methods for Evaluating Solid Wastes, 3rd Edition", SW 846, 1994; 3) "Standard Methods for the Examination of Water and Wastewater", 18th ED. 1992; 4) ASTM Method; 5) 40 CFR, Part 261

Reviewed By: Becka Johansen Date 9/19/00
9/19/00 13:30

Post-it® Fax Note 7671	Date	# of pages ▶
To TIM SAGE	From	
Co./Dept. JBR	Co.	
Phone #	Phone #	
Fax # 801/942-1852	Fax #	

SVL ANALYTICAL, INC.
One Government Gulch ▪ P.O. Box 929 ▪ Kellogg, Idaho 83837-0929 ▪ Phone: (208)784-1258 ▪ Fax: (208)783-0

REPORT OF ANALYTICAL RESULTS

CLIENT : JBR Environmental Consultants

SVL JOB No. : 95406
SVL SAMPLE No.: 242617

CLIENT SAMPLE ID: SCH-N
Sample Collected: 8/22/00 13:30
Sample Receipt : 8/29/00
Date of Report : 9/19/00

% Moisture: 0.5%
Matrix: ESOIL
Extract: MWMP 9/06/00

Determination	Result	Units	Method	Test Date	Reference
% Passing -200	10.0	g	Sieve	9/06/00	
Moisture to Sat.	579	mL		9/06/00	
MWMP TIME	24.0	(hr)	MWMP	9/06/00	
pH	8.56		150.1	9/12/00	1
pH LIXIVIANT	5.86		150.1	9/06/00	1
pH Paste	8.74		ASA M9	9/15/00	
Weight	5.00	kg		9/06/00	
TDS	1890	mg/L Ext	160.1	9/11/00	1
Cyanide-WAD	<0.01	mg/L Ext	1677	9/14/00	
Sodium	572	mg/L Ext	200.7	9/14/00	1
Nitrite-N	2.38	mg/L Ext	300.0	9/11/00	1
Nitrate-N	9.81	mg/L Ext	300.0	9/11/00	1
Sulfate, SO4	1680	mg/L Ext	300.0	9/11/00	1
Silver	<0.005	mg/L Ext	200.7	9/14/00	1
Arsenic	0.062	mg/L Ext	206.2	9/13/00	1
Barium	0.015	mg/L Ext	200.7	9/14/00	1
Cadmium	<0.002	mg/L Ext	200.7	9/14/00	1
Chromium	<0.006	mg/L Ext	200.7	9/14/00	1
Mercury	0.0004	mg/L Ext	245.1	9/12/00	1
Lead	0.076	mg/L Ext	239.2	9/14/00	1
Selenium	0.013	mg/L Ext	270.2	9/14/00	1

REFERENCES: 1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-20; 2) "Test Methods for Evaluating Solid Wastes, 3rd Edition", SW 846, 1994; 3) "Standard Methods for the Examination of Water and Wastewater", 18th ED. 1992; 4) ASTM Method; 5) 40 CFR, Part 261

Reviewed By: Blake Johnson Date 9/19/00
9/20/00 13:30

SVL ANALYTICAL, INC.

Quality Control Repo

Part I Prep Blank and Laboratory Control Samp

Client :J&R Environmental Consultants SVL JOB No. :95406

Analyte	Method	Matrix	Units	Prep Blank	True—LCS—Found		LCS %R	Analysi Date
Silver	200.7	ESOIL	mg/L Ext	<0.005	1.00	0.996	99.6	9/14/0
Barium	200.7	ESOIL	mg/L Ext	<0.002	1.00	0.995	99.5	9/14/0
Cadmium	200.7	ESOIL	mg/L Ext	<0.002	1.00	1.02	102.0	9/14/0
Chromium	200.7	ESOIL	mg/L Ext	<0.006	1.00	0.999	99.9	9/14/0
Sodium	200.7	ESOIL	mg/L Ext	<0.1	20.0	19.4	97.0	9/14/0
Arsenic	206.2	ESOIL	mg/L Ext	<0.001	0.050	0.045	90.0	9/13/0
Lead	239.2	ESOIL	mg/L Ext	<0.001	0.050	0.049	98.0	9/14/0
Selenium	270.2	ESOIL	mg/L Ext	<0.001	0.050	0.044	88.0	9/14/0
Mercury	245.1	ESOIL	mg/L Ext	<0.0002	0.0050	0.0053	106.0	9/12/0
Nitrite-N	300.0	ESOIL	mg/L Ext	<0.05	3.65	3.80	104.1	9/11/0
Nitrate-N	300.0	ESOIL	mg/L Ext	<0.05	19.4	19.7	101.5	9/11/0
Sulfate, so4	300.0	ESOIL	mg/L Ext	<0.3	18.4	19.5	106.0	9/11/0
Cyanide-WAD	1677	ESOIL	mg/L Ext	<0.01	2.0	2.0	100.0	9/14/0
pH	150.1	ESOIL		5.62	9.08	9.06	99.8	9/12/0
pH Paste	ASA M9	ESOIL		N/A	8.60	8.60	100.0	9/15/0
TDS	160.1	ESOIL	mg/L Ext	<10	337	288	85.5	9/11/0

LEGEND:

LCS = Laboratory Control Sample LCS %R = LCS Percent Recovery N/A = Not Applicable

SVL ANALYTICAL, INC

Quality Control Repc

Part II Duplicate and Spike Analys

Client :JBR Environmental Consultants SVL JOB No :95406

Test	Method	Matrix	QC SAMPLE ID Units	Result	Duplicate or MSD Found	RPD%	Matrix Spike Result	SPK ADD	%R	Test Date
Ag	200.7	ESOIL	1 mg/L Ex	<0.005	<0.005	UDL	0.856	1.00 A	85.6	9/14/(
Ba	200.7	ESOIL	1 mg/L Ex	0.146	0.145	0.7	1.14	1.00	99.4	9/14/(
Cd	200.7	ESOIL	1 mg/L Ex	<0.002	<0.002	UDL	1.02	1.00	102.0	9/14/(
Cr	200.7	ESOIL	1 mg/L Ex	<0.006	<0.006	UDL	1.01	1.00	101.0	9/14/(
Na	200.7	ESOIL	1 mg/L Ex	85.8	85.2	0.7	103	20.0	86.0	9/14/(
As	206.2	ESOIL	1 mg/L Ex	0.135	0.146	7.8	0.186	0.0500	102.0	9/13/(
Pb	239.2	ESOIL	1 mg/L Ex	0.089	0.095	6.5	0.161	0.0500	144.0	9/14/(
Se	270.2	ESOIL	1 mg/L Ex	0.004	0.004	0.0	0.052	0.0500	96.0	9/14/(
Hg	245.1	ESOIL	1 mg/L Ex	0.0003	0.0003	0.0	0.0014	0.0010	110.0	9/12/(
NO2-N	300.0	ESOIL	1 mg/L Ex	1.68	1.61	4.3	11.7	10.0	100.2	9/11/(
NO3-N	300.0	ESOIL	1 mg/L Ex	19.7	19.9	1.0	30.8	10.0	111.0	9/11/(
SO4	300.0	ESOIL	1 mg/L Ex	70.4	71.3	1.3	123	50.0	105.2	9/11/(
CN-WAD	1677	ESOIL	1 mg/L Ex	<0.01	0.1 M	0.0	0.1	0.100	100.0	9/14/(
pH	150.1	ESOIL	1	8.85	8.86	0.1	N/A	N/A	N/A	9/12/(
TDS	160.1	ESOIL	1 mg/L Ex	510	497	2.6	N/A	N/A	N/A	9/11/(

LEGEND:

RPD% = (|SAM - DUP|/((SAM + DUP)/2) * 100) UDL = Both SAM & DUP not detected.

RPD% = (|SPK - MSD|/((SPK + MSD)/2) * 100) M in Duplicate/MSD column indicates MSD.

SPIKE ADD column, A = Post Digest Spike; %R = Percent Recovery N/A = Not Analyzed; R > 4S = Result more than 4X the Spike Added

QC Sample 1: SVL SAM No.: 242616 Client Sample ID: SCH-S

9/19/00 13:

TOTAL P.09